ions are and how great is the degree of ionisation. It is only for aqueous solutions that Arrhenius was able to give a practically realisable definition of degree of ionisation, and it is on this definition that the whole effective work on aqueous electrolytes is based; and until some general practically applicable principle of a similar character is attained for hydrates, the work done on that subject, however interesting and important it may be in itself, must necessarily be of an isolated character.

Arrhenius did not originate the doctrine of electrolytic dissociation or free ions: that was enunciated in 1857 by Clausius, and remained relatively barren. What he did was to introduce measurable quantities into the doctrine, and to show its simple quantitative applicability to aqueous solutions; immediately it became fertile. And as soon as a simple quantitative principle is developed for hydrates in solution, that doctrine will become fertile also.

It is surely now time that all the irrelevant and intemperate things that have been said and written by supporters of the osmotic pressure and electrolytic dissociation theories on the one hand, and by those of the hydrate theory on the other, should be forgotten. Far from being irreconcilable, the theories are complementary, and workers may, each according to his proclivity, pursue a useful course in following either. One type of mind finds satisfaction in using a handy tool to obtain practical results; another delights only in probing the ultimate nature of the material with which he works. For the progress of science both types are necessary—the man who determines exact atomic weights as well as the man who speculates upon the nature of the atoms. That the want of knowledge as to what the exact nature and mechanism of osmotic pressure is, should prevent accurate experimental work being done on it, or interfere with its use in theoretical reasoning, is equally ridiculous with the proposition that because in the theory of osmotic pressure we have a good quantitative tool for the investigation of solutions, therefore we should abandon altogether the problem of its nature.

The fundamental ideas of a science are the gift to that science of the few great masters; the many journeymen investigators may be trusted to utilise them according to their abilities. Having once given his great principles to the world, van 't Hoff remained practically a spectator of their development; but by his single act he provided generations of chemists with useful and profitable fields for their labour.

NOTES.

SIR ARCHIBALD GEIKIE, K.C.B., president of the Royal Society, Prof. Svante A. Arrhenius, and Prof. Elias Metchnikoff have been elected honorary members of the Vienna Academy of Sciences.

WE regret to announce the death, on August 23, at sixty-three years of age, of the Rev. F. J. Jervis-Smith, F.R.S., late university lecturer in mechanics and Millard lecturer in experimental mechanics and engineering, Trinity College, Oxford.

THE death is announced, at the age of eighty-two years, of Dr. G. F. Blandford. Dr. Blandford early devoted himself to the study of insanity, and was for many years lecturer on psychological medicine at St. George's Hospital. His chief work, "Insanity and its Treatment," was published first in 1871, and passed through several editions. In 1895 he delivered the Lumleian lectures on "The Diagnosis, Prognosis, and Prophylaxis of Insanity" before the Royal College of Physicians. In 1877 he was president of the Medico-psychological Association, and his address for the year was on "Lunacy Legislation." In 1887 he delivered an address before the International Congress of Medicine at Washington on "The Treatment of Recent Cases of Insanity in Private and in Asylums."

THE death is announced of Prof. Georges Dieulafoy, in his seventy-second year. Prof. Dieulafoy was well known in French medical circles, and was professor of clinics in the Necker Hospital, succeeding Prof. Trousseau in 1896. He was known as an author by the six volumes of his "Leçons cliniques de l'Hôtel-Dieu" and his "Manuel de pathologie interne," which has reached a seventeenth edition. He was a member of the Paris Academy of Medicine and a Commander of the Legion of Honour.

WE regret to record the death of Mr. J. R. Mortimer, of Driffield, on August 20, in his eighty-seventh year. Mr. Mortimer was one of the few remaining antiquaries of the old type, and during the past half-century he thoroughly investigated the archæological treasures of the East Riding of Yorkshire, in an area adjoining the field of Canon Greenwell's investigations. Mr. Mortimer excavated more than 300 Bronze-age burial mounds, and a number of Anglo-Saxon cemeteries, and also carefully mapped the elaborate series of prehistoric earthworks which occur on the Yorkshire Wolds in all directions. To a smaller extent he excavated Roman and later sites, and also made extensive collections from the chalk and other secondary formations in his district. These he transferred to a special building at Driffield, which has long been the rendezvous of antiquaries and geologists interested in East Yorkshire. This museum also contains a very large collection of stone and bronze axes, flint arrows, spears, &c., which number tens of thousands, all of which have been obtained in the vicinity. Mr. Mortimer was the author of numerous papers and memoirs, a complete list of which will be found in *The Naturalist* for May last. His principal work, however, is the massive volume "Forty Years' Researches in the British and Saxon Burial Mounds of East Yorkshire," which was published a few years ago by Browns. Besides elaborate tables of measurements of crania, &c., and hundreds of plans and sections of the barrows and earthworks, this volume has illustrations of more than a thousand Bronze-age drinking cups, food vessels, cinerary urns, and bronze and stone implements, from beautiful drawings made by his daughter, Miss Agnes Mortimer. This book, and his magnificent museum, will ever remain monuments to his memory.

THE death is announced of Mr. John Griffiths, the well-known fossil collector of Folkestone. He rendered important service to Mr. F. H. Hilton Price and Mr. J. Starkie Gardner in their researches on the Gault and associated formations, and he discovered a large proportion of the most important Gault fossils now in the British Museum and the Museum of Practical Geology.

THE Scunthorpe Urban District Council has appointed Mr. T. Sheppard, of the Hull Municipal Museums, as expert adviser to the new public museum at Scunthorpe.

IT is announced that on Saturday, September 9, an aërial postal service will be started between Hendon and Windsor. This scheme, which has the sanction of the Postmaster-General, was conceived by Mr. D. Lewis Poole and Captain W. G. Windham, and a contract has now been made with the Grahame-White Company for the carriage of mails by suitable pilots. Post-cards and envelopes, bearing a design of Windsor Castle, have been prepared, and will be on sale, at the price of 6½*d.* and 1*s.* 1*d.* respectively, in the establishments of a number of large firms in London. The letters must be posted in special boxes provided in these establishments, from which they will be collected and conveyed daily to Hendon by motor-van. The mail-bags will be also flown daily, weather permitting, to Windsor from the Hendon ground, and the correspondence distributed from there through the ordinary postal channels. All proceeds from the sale of the post-cards and envelopes will be devoted to charity. Captain Windham, the most active mover in the present scheme, inaugurated the first aërial post in India last February.

A SEISMOGRAPH has recently been installed in the Tunnel Colliery, Nuneaton, the object being to ascertain if the apparently inexplicable falls of coal and roof in mines have any relation with the occurrence of earthquakes. Whether or no the problem admits of solution in this direction, there can be no doubt that the comparison of earthquake records obtained on the surface and in mines will lead to interesting results.

IN the July number of *The Cairo Scientific Journal,* Mr. J. Craig discusses some results derived from the anthropometrical material which he had previously investigated and published in *Biometrika.* The measurements dealt with 9000 prisoners of Egyptian nationality, and were taken by the Anthropometric Bureau of the Ministry of the Interior from about 1902 to 1908. The relations of the Copts to the Moslem population, of the urban to the rural population, and of the people of Lower Nubia to the rest of Egypt, were studied, and though the data were not sufficient to support definite conclusions, indications were found of a differentiation into eastern, centre, and western delta districts; Girga and Qena provinces stood apart from Lower Nubia and Aswan on one hand, and from the rest of Upper Egypt on the other. The recent census is utilised to show the amount of migration of males from one province to another.

IT is satisfactory to learn from the report of the Maidstone Museum, Library, and Art Gallery for the period comprised between November, 1908, and October, 1910, that investigations have been undertaken in relation to the origin and purpose of the megalithic monuments of the district, more especially the one at Coldrum. Excavations undertaken beneath the dolmen occupying the centre of the stone circle at that spot revealed evidence of human interments, but nothing indicative of systematic burial or of the date when the interments were made. The skulls have been submitted to an expert, whose opinion as to their age and race had not been received when the report went to press. A model of the Coldrum structures has been presented to the museum by Mr. F. J. Bennett.

A FINE skull of the horned Dinosaur, *Triceratops prorsus,* has just been added to the gallery of fossil reptiles in the British Museum (Natural History). The specimen was discovered in the Laramie formation (Upper Cretaceous) of Wyoming, U.S.A., by Mr. Charles H. Sternberg, who undertook a special expedition for the purpose of making this addition to the museum collection. It is nearly complete, only the middle of the occipital crest, the left horn-core, and the left quadrate bone being restored in plaster. The skull proper measures 3½ feet in length, while the crest extends backwards for another 3 feet, and rises above the level of the tips of the horns. The brain-cavity has been carefully cleaned by the preparator, Mr. Frank O. Barlow, and a cast has been made in plaster. The total length of the cavity is only 10 inches, and its extreme width across the cerebral hemispheres is 2½ inches. For some time the museum has possessed a plaster copy of the restored skeleton of Triceratops as mounted in the National Museum at Washington, but the new specimen is the first actual skull of this remarkable reptile which has been exhibited in Europe. Portions of two skulls of the same genus, also discovered by Mr. Sternberg, have lately been acquired by the Senckenberg Museum, Frankfurt, where they are now being prepared.

The Times of August 28 gives an interesting and very graphic account of a remarkable hailstorm in the Pyrenees on August 16. The narrative of the storm is written by Mr. D. W. Wheeler, who, with his wife and Mr. O. P. Tidman, were encamped in the valley of Arayas, by the side of the Ordesa River. The valley lies on the Spanish side of the Pyrenees, in the Provincia de Huesca, five or six miles directly south of the Cirque of Gavarnie, and has an altitude of 4400 feet. Two storms were experienced, the first shortly after 11 a.m., and this was preceded by a clouding in of the sky and darkness. Mr. Wheeler says that midway in the darkness was the clear-cut straight line of cloud which invariably tells of hail. At first a few isolated hailstones were experienced, but soon the air suddenly became full of hailstones, and in a few minutes the storm had passed. The average size of the hailstones in the first storm is described as that of a marble, but mixed with these was a scattering of much larger stones, almost as large as golf-balls. Another storm, which followed fairly quickly on the first, was more severe. At first marble-sized hail fell and lightning blazed. Suddenly the whole land was bombarded by great hailstones as large as lawn-tennis balls. The violence of the hail is described as surpassing anything that had been previously heard of. All the mountains around were white with the covering of stones, which lay over everything like a sheet, so that in an hour summer had become winter. The smaller branches of trees had fallen as if they had been clipped by hedgers. The open grassland is described as pitted with holes, some of them a couple of inches in depth, and of about the same diameter. Testing the weight of the stones in two instances, in one six stones went to the kilogram, in the other five, which gives 5 and 7 ounces respectively. The size was that of a tennis-ball, and almost uniform. The storm wrought much destruction in the Pyrenean valleys. Seventy sheep were said to have been killed on the heights immediately above the position occupied by the writer of the narrative. Above the village of El Plan, thirty-five cows and some mules were killed. The size of the hailstones is said to have varied in different parts, according to different peasants' accounts, from "hen's eggs" to that of the closed fist. The Paris *Bulletin International* gives no indication of any atmospheric disturbance over the Spanish Peninsula. Mr. Wheeler directs attention to a hailstorm which occurred in Moravia in 1889, which is described in "Chambers's Encyclopædia," where the hailstones are said to be the size of a man's fist, and weighing 3 lb. Mr. Wheeler suggests that this should be three to the lb. The Hon. Rollo Russell, in his work on "Hail," describes a storm in the Orkneys in October, 1890, in which stones fell the size of a goose's egg, and the weight of the largest stones was estimated at 8 oz., and some penetrated the ground to the depth of 4 inches, whilst the depth of the hail in the open fields was 9 inches.

THE drought of July in this country and the serious drought in India are referred to in *Symons's Meteorological Magazine* for August. A map shows the parts of the United Kingdom in which more than ten consecutive days without rain occurred; in some districts in England, Wales, and the south of Ireland the rainfall was under 5 per cent. of the average, but was rather above the average in the west of Scotland. The duration of twenty-five days of drought was general to the west of a line drawn from the Solent to Dunstable (Bedfordshire); several places had no rain for the whole month, and the same district suffered droughts in May and June, and again in August. In India the feebleness of the south-west monsoon has caused great anxiety. Reports in *The Times* and other papers showed that up to July 28 the area most affected was west of a line drawn from Bombay through Jubbulpore to Darbhanga: nearly half of the whole country. A report dated August 21 showed, however, that conditions had greatly improved in several provinces, although famine appears to be certain in Kathiawar and Gujarat. In parts of the United Provinces and the Punjab the canals and rivers were also well supplied with water from the melting of the snow of last spring in the Himalayas.

THE Australian Monthly Weather Report for July, 1910 (lately received), contains an interesting article by Mr. E. T. Quayle on the amount of dust suspended in the atmosphere at Melbourne. One of Dr. Aitken's dust counters was in regular use at the Weather Bureau from March to July, 1909; one observation was usually made in the morning and another in the afternoon of each day. The average number of particles per cubic inch during this period was 674,000; the number steadily increased from an average of 460,000 during the first fortnight to 909,000 in the last, indicating a tendency to a winter maximum. This increase appeared to be seasonal, probably due to the diminished power of the sun in causing convectional movements of the air, and to greater relative humidity, rather than to smoke from chimneys. Taking only those days on which the wind direction remained the same, the morning observations gave an average of 638,000, and the afternoon 536,000. Wind direction had a considerable effect, the north wind being least dusty, and the north-east the most so, calms being by far the most dusty. The fact that the northerly winds in Melbourne are the least dusty is entirely contrary to the general impression on this subject. The greatest number of dust particles obtained in any one observation was 1,902,000 on a calm morning during a dense fog; the lowest recorded was 128,000, on a wet day.

IN conformity with the new regulations introduced by the Indian Museum Act of 1910, the report of the superintendent of the zoological and anthropological section of the museum at Calcutta for 1910–11 is issued in two divisions, one dealing with the progress and general condition of the establishment as a whole, and the other with the aforesaid section. In the former, after reference to the complete reorganisation of the various sections of the museum and the progress on a new wing, it is stated that the most unsatisfactory feature is the relatively small number of Europeans by whom the galleries are visited, the ratio being 15,485 Europeans to 786,519 natives. In the sectional portion of the report it is mentioned that the augmentation of the scientific staff has rendered it possible to provide instruction in the methods of zoological research, and likewise to institute inquiries relating to the fishing industries of the country. The report also contains two letters relating to the volumes on invertebrates in the "Fauna of British India," with reference to the advisability of engaging for this work the services of naturalists personally acquainted with India, and also whether the work could be best done in Calcutta or London.

IN the Transactions of the Lincolnshire Naturalists' Union for 1910 attention is directed by the president to the excellent manner in which the Lincoln Museum is discharging its proper and legitimate function as an exposition of everything connected with the natural history and antiquities of the county, strictly limiting its scope to the productions of that area. To this issue Mr. G. W. Mason contributes the fourth part of his catalogue of Lincolnshire Lepidoptera.

IN *The Field* of August 19 Mr. Pocock expresses the opinion that the animal commonly known in this country as the chita (*Cynaelurus jubatus*) is closely allied to the more typical cats, the puma, and the lynx, whereas lions, tigers, leopards, and jaguars are as markedly different. This conclusion is largely based on the fact that in the former group the hyoid apparatus is intimately connected with the skull, and that these animals purr instead of roaring. In the second group, on the contrary, the hyoid is suspended to the skull by means of a pair of long elastic cartilages, this structure being apparently connected with the power of roaring. The partial retractility of the claws of the chita is regarded as an adaptive feature connected with speed, for which this animal is specially built. It may be mentioned that in India the name chita (meaning spotted) is applied indifferently to the leopard and to *Cynaelurus jubatus*, for which reason "hunting leopard" is a preferable designation for the latter.

IN *The Zoologist* for August Captain Stanley Flower records his impressions of zoological gardens, museums, and aquariums in various parts of Europe visited by himself during the last three years, these including Birmingham, Brighton, Brunn-am-Gebirge (Austria), Cologne, Halifax, Lyons, Marseilles, Munich, Naples, Paris, Southampton, Stuttgart, and Vienna.

THE first of a series of "Behaviour Monographs" (New York: Hy. Holt and Co., 1911) in connection with *The Journal of Animal Behaviour* is by Mr. F. S. Breed, and deals with the development of certain instincts and habits in chicks. The results of a great number of experiments are tabulated and plotted. The author considers that the initial accuracy of the instinctive pecking has been exaggerated, and regards the improvement observed in the early days of life as due rather to the maturing of the organic mechanism than to the effects of habit. The efficiency of pecking has reached nearly 60 per cent. of accuracy by the beginning of the third day, about 80 per cent. on the eleventh day, after which it rises to a limit of about 85 per cent. The experiments on the rate of learning to respond differentially to objects of different brightness, colour, and size are carefully devised. The results of tests with differences of form were, however, negative. There was no conclusive evidence that the previous establishment of differential response to different colours facilitated that of responding to different sizes.

IN a paper on the birds inhabiting the bush (forest) districts of New Zealand, published in *The Emu* for July, Mr. J. C. M'Lean states that the number of such species is much less than in Australia. Originally there were only about a score of birds with strictly arboreal habits to be found in the whole of the North Island, and of these many which were once common are now rare, while one or two may possibly be extinct. An impression has, indeed, prevailed among ornithologists that nearly all the New Zealand bush-birds are *in extremis*; but this, it is satisfactory to learn, is not shared by Mr. M'Lean, who is of opinion that, although many are retreating before the axe and forest-fires, yet they are still to be met with in considerable numbers in the higher and more remote bush-country, where, it may be hoped, steps will be taken for their preservation.

IN vol. lvi., No. 21, of the Smithsonian Miscellaneous Collections Mr. E. W. Nelson describes a humming-bird from an elevation of about 3000 feet on Cerro Azul, in the Chepo district of Panama, which is referred to a new genus and species, *Goldmania violiceps*. The new bird is allied to the members of the large genus Saucerottea, but distinguished by certain peculiarities of the under tail-coverts and primary quills, and the short feathers of the tarsus, which leave the outer side of that segment exposed.

With the exception of the crown, forehead, and lores, which are iridescent violet, the general colour of the upper parts is metallic-green.

Paramaecium aurelia and *P. caudatum* are the subject of several observations by L. Woodruff (*Journ. of Morphol.*, June; *Journ. Exper. Zoology*, July; Proc. Soc. Exper. Biology, viii.). He finds that these protozoa grow well in a medium of beef extract, that the rate of reproduction in hay infusion is influenced by the volume of the culture medium, and that the organisms excrete substances which are toxic to themselves. The great majority of individuals of *aurelia* and *caudatum* can be distinguished both by shape and by size, but the power of reproduction of the two is practically identical. The macronucleus is subject to such variation that it affords no diagnostic feature; the micronuclear apparatus, on the other hand, affords crucial diagnostic characters.

A COLLECTION of six short papers is published in vol. xiii., part x., of the Contributions from the United States National Herbarium. A lichen contribution by Mr. A. W. C. Herre deals with the family Gyrophoraceæ in California; the single species *Umbilicaria semitensis*, and twelve species of Gyrophora, are described. Some interesting facts are noted by Mr. W. H. Brown as the result of observations upon plant life in four shallow lakes in North Carolina. Lake Ellis, the most fertile, is three miles long with a maximum depth of 2 to 3 feet. Three zones of vegetation are clearly distinguishable, dependent primarily on substratum, not on depth of water, which is fairly uniform. The central zone, underlaid by sand, carries a sparse growth of *Eriocaulon compressum* mingled with Eleocharis in shallower spots. The substratum becomes muddier in the intermediate zone, where *Philotria minor*, *Panicum hemitomon*, and *Eleocharis interstincta* are conspicuous, and in the thicker sediment of the marginal zone *Eleocharis mutata*, *Castalia odorata*, grasses, and sedges are the most prominent plants.

As the conditions of the various regions of the United States cause marked vegetation differences, there is a corresponding variety about the problems attacked by the various agricultural experiment stations. Both at the Connecticut and Wisconsin stations, as well as elsewhere in the old settled regions, the problem is to restore the lost fertility of the soil consequent on many years of pioneer agriculture. Especially are some of the Wisconsin clay soils deficient in phosphates, so that small dressings of rock phosphate are producing unexpectedly large returns. The management of sandy soils and of peat soils is also receiving attention, and under Prof. Whitson's direction some very useful work on soil improvement is being carried out. Another direction is given to the work at Connecticut. Considerable attention is being paid to dairying and fruit-growing, both of which systems tend to make the most of the soil and at the same time maintain its fertility. A batch of bulletins is recently to hand dealing with the renovation of old orchards and the planting of new ones, and with various dairy problems of practical importance.

THE July number of *The Cairo Scientific Journal* contains a preliminary note by Dr. W. Bean on the soils of the Gezira. A large tract on the left bank of the Blue Nile from Wad Medani to Kamlin is to be irrigated, and very wisely a thorough examination of the soil has been undertaken, samples being collected down to a depth of more than a metre along several lines across the area included in the scheme. The soils, both the more and the less fertile as the natives classify them, are well supplied with potash and phosphates, but, like most Egyptian and Sudan soils, are markedly deficient in organic matter and nitrogen, so that the results which may be obtained from their cultivation will largely depend on their treatment with respect to this deficiency. Rotation with a leguminous crop has not been used on most Sudan soils, but the experiment when made on a small scale near Khartoum gave results exceeding all expectations.

THE report of the Chemical Laboratories of the Survey Department of Egypt is this year published separately. Mr. A. Lucas, in discussing the work for 1910, reviews the various stages by which the work has developed since its commencement in 1899. Almost all the work is done for Government departments, and as approximately 40 per cent. of the materials offered or delivered are found to be adulterated or of very inferior quality, the laboratories furnish a valuable safeguard on expenditure made. In spite of this the importance of systematic analysis of supplies and accurately drawn up specifications is only being slowly realised, and the samples of material examined still bear but a small proportion to the number which would represent an adequate control of the supplies purchased.

IN continuation of an earlier contribution dealing with the Allioniaceæ of the United States, Mr. P. C. Standley has prepared a synopsis of the Mexican and Central American species of the family ordinarily known as the Nyctaginaceæ, that is published in the Contributions from the United States National Herbarium (vol. xiii., part xi.). Twenty-two genera are differentiated, but some of these are changes of name that are not sufficiently explained. Among the new species are additions to Allionia, Boerhaavia, Neea, and Pisonia. An interesting ubiquitous species is *Pisonia aculeata*, that owes its distribution to the viscid glands on the fruit.

THE prospects of viticulture in Rio Grande do Sul, the southernmost State of Brazil, are discussed by Senor A. de Azambuja in a pamphlet reprinted from articles in the *Gazeta do Commercio*, published at Porto Allegre. The first vine, introduced about sixty years ago, was the American variety Isabella. Other American and some European varieties were tried later, and the cultivation was taken up by Italian colonists. Different varieties have been grown with the object of discovering those suitable for producing table fruit, wine, and currant grapes. In recommending the Isabella and other American varieties of the *labrusca* species, the author claims that first-class wines can be produced when the details of manufacture are improved.

A SUMMARY of Dr. Kienitz's important investigations into the shapes and types of *Pinus sylvestris* is provided by Mr. B. Ribbentrop in the Transactions of the Royal Scottish Arboricultural Society (vol. xxiv., part ii.). The two extreme types are represented by the strong-branched, broad-crowned tree common in Scotland, and the slender pyramidal shape characteristic of the Baltic pine. The chief result of Dr. Kienitz's researches and experiments has been to demonstrate the heredity of special forms or races, even when transferred to different conditions of climate and soil, and thereby to prove the necessity for getting the best and most suitable seed. It is noted that the much-branched tree is better fitted to hold its own in the struggle for light, and is the prevailing form in milder localities, whereas the slender form is developed under more rigorous conditions, where heavy snowfalls constitute a primary source of danger.

THE volume of *Mitteilungen* of the Berne Scientific Society for 1910 contains an interesting attempt by P. Gruner to render the principle of relativity intelligible to the less mathematical reader. The twenty-one pages of "elementary" presentation still offer a formidable array of complex arguments, many of which are by no means easy to follow. Gruner imagines the inhabitants of earth and Mars as engaged in an attempt to unify and connect their respective time and space scales without the aid of astronomical observations of any other bodies, but with the free use of wireless telegraphy for mutual communications. He shows how, owing to relative motion, the scales must differ, and deduces Einstein's transforming equations in a simple manner. The scheme and argument could, no doubt, be still further simplified, and the simpler the better. Even this simplification tends to bring out the essential weakness of the theory, which assumes that successive light waves from a moving source are not concentric, and at the same time postulates, on the basis of Michelson's experiment, that this eccentricity cannot be discovered. Everything would be so much simpler if the speed of the body were added to the speed of the light it emitted, a supposition which, indeed, does not appear to contradict any astronomical observations.

ALTHOUGH the "exploring electrode" method of determining the distribution of electrical potential in the kathode dark space of a vacuum tube through which an electric discharge is passing has been suspected for some time, and has recently been superseded by the measurement of the deflection of a beam of kathode rays shot transversely through the discharge, it is important that the reason for the divergent results obtained by the former method should be ascertained. Prof. Wehnelt shows in a paper in the *Verhandlungen der Deutschen Physikalischen Gesellschaft* for July 30 that any small obstruction placed in the kathode dark space acquires a positive charge, and its potential is therefore higher than that of the point at which it is placed. Between the kathode and the obstruction the rise of potential is linear, but between the obstruction and the kathode glow it is curved, showing that electric charges are present in this portion of the discharge.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR SEPTEMBER:—

Sept. 2. 22h. 0m. Saturn stationary.
4. 4h. 37m. Uranus in conjunction with the Moon (Uranus 4° 35′ N.).
9. 3h. 0m. Mercury in inferior conjunction with the Sun.
13. 1h. 48m. Saturn in conjunction with the Moon (Saturn 4° 22′ S.).
14. 0h. 39m. Mars in conjunction with the Moon (Mars 4° 32′ S.).
15. 0h. 0m. Venus in inferior conjunction with the Sun.
17. 9h. 28m. Neptune in conjunction with the Moon (Neptune 5° 46′ S.).
20. 23h. 11m. Venus in conjunction with the Moon (Venus 13° 14′ S.).
23. 16h. 18m. Sun enters sign of Libra.
25. 2h. 0m. Mercury at greatest elongation W. of the Sun (17° 52′).
,, 12h. 0m. Mercury in perihelion.
,, 16h. 5m. Jupiter in conjunction with the Moon (Jupiter 2° 11′ N.).

BROOKS'S COMET, 1911*c*.—During several of the clear evenings which obtained at the latter end of last week, Brooks's comet was faintly visible to the naked eye of an observer who knew where to look for it. Ordinary opera-glasses showed it as a distinct nebulosity, and in the field of a 3¼-inch refractor it was a really brilliant object, some 5′ or 6′ in diameter, having a distinct nucleus. On Sunday night, at Gunnersbury, Mr. W. E. Rolston found the comet, as seen with opera-glasses, to be no less conspicuous than ω^1 Cygni (mag. 5·6), which it immediately preceded.

ENCKE'S COMET, 1911*d*.—Observations of Encke's comet, made by Dr. Gonnessiat at the Algiers Observatory, are recorded in No. 4518 of the *Astronomische Nachrichten*. On August 1, under excellent atmospheric conditions, the comet was seen before ninth-magnitude stars which were rising at the same time, and if seen in a dark sky would probably have equalled in brightness stars of the seventh or eighth magnitude.

Dr. Backlund briefly discusses the recent observations, and gives an ephemeris extending to September 21. At present the comet is apparently about 2° south-east of ν Leonis, and is travelling south of, and almost parallel to, the ecliptic, down through Virgo towards Libra; on September 14 it will be some 5° south of Spica.

THE ASPECT OF NOVA LACERTÆ.—On a photograph taken with fifty minutes' exposure on August 11, Herr Kostinsky found that the image of Nova Lacertæ was surrounded by a well-defined luminous aureole (black on the negative) similar to that which surrounded the images of Nova Persei in 1901. This aureole is not to be seen on similar negatives secured in January and February; therefore Herr Kostinsky deduces it may be taken as an indication that the nova has now become a gaseous nebula in the spectrum of which only bright radiations of hydrogen and the nebula lines are represented. The photographic magnitude of the nova on August 11 was about 10·5 (*Astronomische Nachrichten*, No. 4518).

KIESS'S COMET, 1911*b*.—An improved set of elements and an ephemeris are given for comet 1911*b*, by Dr. Kobold, in No. 4518 of the *Astronomische Nachrichten*. The comet reached its most southerly point on August 24, and is now travelling northwards slowly. For the next fortnight its apparent path lies through the constellation Telescopium. This comet was discovered independently by Herr Raimond Moravansky in Moravia on August 5, and the observation sent to Kiel; but this was nearly a month later than the discovery by Mr. Kiess.

THE EARLY VISIBILITY OF THE NEW MOON.—From calculations based on the data given by Mr. Horner for his remarkably early detection of the new moon, on February 10, 1910, Mr. Whitmell finds, after correcting for parallax, &c., that the difference in altitude between sun and moon at the moment of observation was only 3° 16′, the moon being 1° 46′ above, and the sun 1° 30′ below, the horizon. The corrected azimuth difference was only 9° 8′, and the moon's age sixteen hours, so that this observation is probably unique in its detection of the crescent so soon after "new moon" (*The Observatory*, No. 438).

VARIABLE STARS.—Observers of variable stars will find part ii., vol. lv., of the Annals of the Harvard College Observatory, prepared by Miss Cannon, useful. It contains a table in which are set out the maxima and minima of a large number of variable stars. For each variable the elements and the dates of observed maxima and minima are tabulated, with a special column showing the differences between the observed and calculated dates.

In No. 4515 of the *Astronomische Nachrichten* Herr Max Mündler publishes the results of a number of observations of variable stars made by him, with a 6-inch comet seeker, at Mundenheim during 1909–10.

WATER SUPPLY IN THE UNITED STATES.

TO its excellent series of pamphlets on water supply the United States Geological Survey has just added three papers, one (No. 270) descriptive of the hydrographical features of the Great Basin, an immense tract of country 208,000 square miles in area (just as large as Germany), and extending over parts of the States of Utah, Nevada, Idaho, Oregon, and California; the other two, practical manuals entitled, respectively, "Underground Waters" (Paper No. 258) and "Well-Drilling Methods" (Paper No. 257).

Of the first pamphlet, it is only necessary to remark that it follows on the same lines as those adopted for similar reports, recently reviewed in these columns, on other of the dozen districts into which the United States